

U.S. Application No.: 10/826,582

RESPONSE F

Reply to Office Action dated 11/01/2008

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ATTORNEY DOCKET NO.: 3926-081

**IN THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1-40. (cancelled)
41. (new) A casting mold for metallic foundry or for precision casting of fine metal parts, wherein the casting mold, or at least a part thereof, is produced by a generative rapid prototyping process comprising
- a) forming a layer of a mixture of ceramic coarse particles and sinterable ceramic fine particles, wherein the average particle diameter of the coarse particles is above 10  $\mu\text{m}$ , the average particle diameter of the ceramic fine particles is below 5  $\mu\text{m}$ , and the average particle diameter of the ceramic coarse particles is at least the 10 fold of the average particle diameter of the ceramic fine particles,
  - b) melting or sintering the ceramic fine particles under the influence of intensive radiation without substantially melting the ceramic coarse particles such that the fine particles form bridges binding the coarse particles, and
  - c) repeating steps a) and b) to form successive layers until a casting mold, or at least a part thereof, comprised of a porous ceramic in the sintered state is formed, wherein the thermal coefficient of expansion of the thus produced ceramic casting mold or part is above approximately  $8.5 \times 10^{-6} \text{K}^{-1}$ .
42. (new) A casting mold as in Claim 41, wherein said intensive radiation is laser radiation.
43. (new) A casting mold as in Claim 41, wherein the fine particles and coarse particles are the same material.

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44. (new) A casting mold as in Claim 41, wherein the coarse particles are oxide ceramics based on Al, Zr and/or Mg, while the fine ceramic particles are based on SiO<sub>2</sub> and/or silicates.
45. (new) A casting mold as in Claim 41, wherein said coarse particles are coated with an organic binder, and wherein fine particles are incorporated in said organic binder.
46. (new) A casting mold as in Claim 45, wherein the proportion of binder phase to ceramic phase is 7% or less. [0018]
47. (new) A casting mold as in Claim 41, wherein the sintering temperature of the fine particles is at least 50°C below that of the coarse particles.
48. (new) The casting mold according to Claim 21, wherein the casting mold includes reinforcing ribs produced using a generative rapid prototyping process.
49. (new) The casting mold according to Claim 21, wherein, at least during casting, the casting mold is back-fed with a fill of ceramic material.
50. (new) A casting mold for metallic foundry or for precision casting of fine metal parts, wherein the casting mold, or at least a part thereof, is produced by a 3D binder printing process comprising
- a) forming a layer of a mixture of ceramic coarse particles coated with a binder and ceramic fine particles,
  - b) dissolving or melting the binder in areas corresponding to the casting mold, or part thereof, so as to cause said coated particles in said areas to adhere,
  - c) repeating steps a) and b) to form successive layers until a green casting mold, or part thereof, is formed,

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d) sintering said green casting mold, or part thereof, to sinter the fine particles without substantially melting the coarse particles such that the fine particles form bridges between the coarse particles, such that said mold or part thereof is comprised of a porous ceramic in the sintered state, and wherein the thermal coefficient of expansion of the ceramic mold is above approximately  $8.5 \times 10^{-6} \text{K}^{-1}$ .

51. (new) The casting mold according to Claim 50, wherein the green casting mold includes 0.5 to 10 wt.% organic binder.
52. (new) The casting mold according to Claim 50, wherein the proportion of binder phase to ceramic phase is 7% or less.
53. (new) The casting mold according to Claim 50, wherein the average particle diameter of the coarse particles is above 10  $\mu\text{m}$ , the average particle diameter of the fine particles is below 5  $\mu\text{m}$ , and the average particle diameter of the coarse particles is at least the 10 fold of the average particle diameter of the fine particles.
54. (new) The casting mold according to Claim 50, wherein said fine particles are incorporated in the binder coating the coarse particles.
55. (new) The casting mold according to Claim 50, wherein the fine particles and coarse particles are the same material.
56. (new) The casting mold according to Claim 50, wherein the sintering temperature of the fine particles is at least 50°C below that of the coarse particles.

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57. (new) The casting mold according to Claim 50, wherein the ceramic mold includes as main component aluminum oxide, zirconium oxide, magnesium silicate, spinel and/or magnesium oxide.
58. (new) The process according to Claim 30, wherein the binder coating the coarse particles is an organic polymer.
59. (new) The powder mixture according to Claim 58, wherein the organic polymer is readily soluble in organic solvent.
60. (new) The powder mixture according to Claim 36, wherein the ceramic coarse particles include oxides of the elements Mg, Al and/or Zr, and the ceramic fine particles are comprised essentially of  $\text{SiO}_2$ , and/or silicates.